



DRAFT Concept Note – AMCOMET / WMO Regional Space Programme for Africa

(African Meteorological Space Implementation Plan)

Following Decision 02/5 taken during the Second Session of AMCOMET, in Victoria Falls, Zimbabwe, in October 2012 “to investigate the feasibility of developing an African Regional Space Programme and to submit its findings for consideration during the Third Session of AMCOMET” and the AMCOMET Bureau Meeting, which took place in Harare, Zimbabwe, in May 2014, which requested the AUC, AMCOST, and AMCOMET to link the African Regional Space Programme to the WMO Space Programme and other on-going regional initiatives, the WMO Space Programme drafted a concept note for consideration by the AMCOMET Task Force on the African Regional Space Programme and WMO Regional Association I (RAI, Africa).

The Concept Note takes into consideration the current pan-African effort to develop its own Regional Space Programme. The **Space Working Group** of the African Union has been established, under the auspices of the African Ministerial Conference on Science and Technology (AMCOST) and the African Union Commission on Human Resources and Science and Technology (AUC-HRST), and is in the process of defining a broader policy and strategy that will guide the framework for the formalization of the African Space Agenda. The five thematic areas include: Earth Observation; Navigation and Positioning; Satellite Communications; Space Physics; and Astronomy. It is further noted that the role of AMCOMET, through the AMCOMET Task Force on the Regional Space Programme, is to provide inputs relevant to operational meteorology and linked to the thematic areas.

This Draft Concept Note **supplements** the efforts of the African Regional Space Programme coordinated by AUC-HRST, with a particular focus on meeting the needs of the meteorological sector. The draft concept and its proposed activities also aim to lead to a roadmap for African governments to enable them to developing the components of a space programme. These components include: building a ground segment, training a critical mass of space scientists and acquiring the requisite tools to support the exploitation of satellite data.

This Draft Concept Note is in line with Strategic Pillar 2 (Enhance the Production and Delivery of Weather and Climate Services for Sustainable Development) of the Integrated African Strategy on Meteorology (Weather and Climate Services), which mentions the need to:

- a. Invest in ground systems, training and analytical tools to make best use of existing satellite and model data and information available from international partners; and in parallel;
- b. Engage with international partners on the design of Numerical Weather Prediction (NWP) and satellite derived products to better address African requirements;

1. Background – Space-based Observation is important for Africa

Africa is the world's second-largest and second-most-populated continent. With about 30.2 million km² (11.7 million sq. mi) including adjacent islands, it covers six percent (6%) of the Earth's total surface area and 20.4 percent of the total land area. With 1.1 billion people as of 2013, it accounts for about 15% of the world's human population. The continent is surrounded by the Mediterranean Sea to the north, both the Suez Canal and the Red Sea along the Sinai Peninsula to the northeast, the Indian Ocean to the east and southeast, and the Atlantic Ocean to the west. The vast land area, the Sahara and Kalahari deserts, the expansive Congo forest, the inland water bodies, the complex and inhomogeneous topography of the Ethiopian and East African highland terrain including the Great Rift Valley as well as the huge oceans around the continent pose great difficulty for the installation and maintenance of in-situ observation networks. Therefore, satellite observations are of critical importance to support weather, climate, marine and environmental products and services for disaster risk reduction, protection of life and property and sustainable socio-economic development of the African continent.

2. Statement of Need

In spite of the rapid developments in the last decade, regional surveys with WMO Members in RA I regularly show that data access, product development and regional capacity in satellite meteorology are still limiting factors to an efficient exploitation of satellite observation data and products. An effective breakthrough could be achieved by leveraging current satellite-related activities, such as those undertaken in cooperation with EUMETSAT, with the aim to provide better satellite data accessibility, the development of regionally-tailored products and services, and the development of technical and human capacity in all WMO application areas dependent on satellites.

In particular, an **AMCOMET / WMO Regional Space Programme for Africa**, focusing on meteorological aspects, should also address key gaps in the application of satellite data for improving weather and climate services, as identified by Members.

3. Current benefits of Earth Observation activities in Africa in cooperation with EUMETSAT

Africa is optimally located in the field of view of the Meteosat Geostationary Satellite, today's most advanced geostationary observing system in the world, operated by EUMETSAT and stationed 36,000km above the Gulf of Guinea (0° Latitude, 0° Longitude). The lifetime of the current Meteosat programme and its follow-on currently extends to the year 2040. In addition, African countries like other members of the meteorological community can take advantage of the observation systems in low Earth orbit such as the polar-orbiting EUMETSAT METOP satellite.

Through the strong partnership developed between Africa and EUMETSAT Member States over the last 20 years, African countries can confidently rely on these operational systems as well as on EUMETSAT support in the area of data access and dissemination (through EUMETCast), training (ASMET and sponsorship of VLab Centres of Excellence) and African user consultation, notably the EUMETSAT User Forum in Africa and the RA-I Data Dissemination Expert Group (RAIDEG). The latter is regularly reviewing African users' priorities for data disseminated through EUMETCast, with the support of WMO Space Programme and EUMETSAT.

The European nations that have joined forces in EUMETSAT have made, and are considering continuing, the support to Africa as one of their high-level policy objectives. In doing so, they combine their efforts with the European Union, the African Union and the

World Meteorological Organization. A number of projects and initiatives have already taken place to help the African meteorological community to implement satellite data access tools, develop applications and the necessary training and human capacity development for meeting their national and regional requirements that include addressing issues of severe weather warnings, water and agriculture management, and mitigation of the effects of natural hazards and climate change. These include the PUMA, AMESD and MESA projects complemented by a number of bilateral activities.

Africa plays an important role in the global climate system, namely through the inter-tropical convergence zone (ITCZ) contributing precipitations to the global water cycle, and through desert areas serving as a source of sand and dust clouds. Moreover, a common concern of Africa and EUMETSAT is the space observations coverage over the Indian Ocean. Therefore, the long-standing partnership between Africa and Europe and their common interest in key environmental observations are major factors to be taken into account when defining a strategy for a future African Regional Space Programme.

4. Lessons Learned from other countries' Space Programmes

Several emerging countries, including India and China, are successfully operating meteorological satellites for weather, climate and environmental applications, in close coordination with the WMO Space Programme and the Coordination Group for Meteorological Satellites (CGMS). The proposed **AMCOMET / WMO Regional Space Programme for Africa**, which focuses on meteorological aspects, can greatly benefit from the experience of the space programmes of these countries, by reviewing their experiences and lessons learned over the past decades. The following points can be highlighted:

- a. All the space programmes include three segments: space segment, ground segment and application segment;
- b. All these space programmes started with Ground Segment activities for receiving and accessing the existing satellite data and products;
- c. The Application Segment to gain utilization expertise, and to identify gaps in existing space observations from the application perspective, is most directly and immediately beneficial to countries. Existing application-related infrastructure should be used and strengthened where possible. The Application Segment should drive the priorities of the AMCOMET / WMO Regional Space Programme for Africa;
- d. The development of a Space Segment can be considered based on a thorough gap analysis using (i) the WMO Rolling Review of Requirements process¹, (ii) the rich experience gained through applications of existing satellite systems, (iii) the identification of more precise needs and identified gaps in current and planned satellite systems.

The scope of the AMCOMET / WMO Regional Space Programme for Africa should thus include Ground Segment, Application Segment and, ultimately, Space Segment. The above elements should be designed to provide a cost-effective Programme, avoid duplication and maximize complementarity with other components of the Global Observing System. The experience gained in many years of satellite applications in Africa would ensure that tangible benefits are reaped from any investment in a Space Segment. A Pilot Project should be started to develop the detailed elements of the AMCOMET / WMO Regional Space Programme for Africa.

¹ As defined by the Manual on the Global Observing System (WMO-No. 544) (Part II, Requirements for observational data)

The AMCOMET / WMO Regional Space Programme for Africa should also build on the experience gained by some African nations with respect to Earth Observation, space technology and applications (e.g. South Africa, Nigeria, Kenya, Algeria, etc.) and should therefore be closely connected with the African Space Policy and African Space Strategy developed at the request of the African Ministerial Conference on Science and Technology (AMCOST), in collaboration with AMCOMET and AUC.

5. Proposed Timeline in Developing a Pilot Project for the AMCOMET / WMO Regional Space Programme for Africa

Item	Owner	Proposed Timeline
Consideration of the Draft Concept Note by the AMCOMET Task Force on the African Regional Space Programme	WMO Space Programme and AMCOMET Secretariat	October – November 2014
Consideration of the Draft Concept Note by WMO RA I	WMO Space Programme and AMCOMET Secretariat	16 th Session of RAI
Endorsement of the Draft Concept Note during AMCOMET-3	AMCOMET Task Force on the African Regional Space Programme and AMCOMET Secretariat	AMCOMET-3
If approved, Establishment of AMCOMET Task Force to develop a Pilot Project		AMCOMET-3
Begin Development of Pilot Project Proposal	Established Task Force and AMCOMET Secretariat, WMO Space Programme	Post AMCOMET-3
Engagement with AMCOST and AUC-HRST	Established Task Force and AMCOMET Secretariat, WMO Space Programme	Following definition of Task Force Terms of Reference and Project Outline